REMARKS

Claims 1-34, 37, and 38 are pending herein. Applicants request that the Examiner review and formally accept the drawings filed February 17, 2004.

Applicants acknowledge and appreciate the Office's finding of allowable subject matter with respect to claims 4-9, 13-16, and 26-33. Applicants elect to keep these claims in dependent form pending the Office's response to these remarks.

Claim Rejections under 35 U.S.C. § 102(b)

Reconsideration of the rejection of claims 37 and 38 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,872,622 (Schildmeyer et al.) is respectfully requested.

Claim 37

Claim 37 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell;
>
> a light trap that accepts the light beam after it passes through the detection cell;
>
> a heated inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and
>
> a heated exit port that extends into said detection cell to control the trajectory of the particles and gas stream; **wherein said heated inlet port and said heated exit port are thermally conductive and said detection cell is thermally nonconductive**.

(emphasis added). None of the references of record disclose such a light scattering detector device. To anticipate a claim, each and every element set forth in the claim must be found in a single prior art reference. M.P.E.P. § 2131. But Schildmeyer et al. fail to teach each and every element of this claim.

Applicants previously argued that Schildmeyer et al. neither taught nor suggested at least a heated inlet port and a heated exit port that are thermally conductive and a detection cell that is thermally nonconductive.

In the Final Office action, the Office again argues that heater 90 of Fig. 8 is a thermally conductive heated inlet port and heater 92 of Fig. 8 is a thermally conductive heated exit port. The Office also repeats its position that the detection cell is thermally nonconductive, again referencing column 4, lines 10-27. This potion of Schildmeyer et al. fails to teach this required element of a nonconductive detection cell.

In particular, Schildmeyer et al. call out no detection cell *per se*, but the optics block 68 depicted in Figs. 6, 8, and 9 is clearly where the light beam and primary stream of gas 94 interact. As such, Schildmeyer et al. must teach that the optics block 68 is thermally nonconductive to anticipate claim 37. But the portion of Schildmeyer et al. referenced by the Office (column 4, lines 10-27) fails to even mention the optics block 68. Instead, this portion of Schildmeyer et al. discusses a first heating system 36 in thermal contact with a saturator 12 and a second heating system 40 in thermal contact with a sample gas stream 22 (see Figs. 1 and 6). Both heating systems 36,40 are well upstream of the optics block 68 (see Fig. 6), and have no bearing on whether or not the optics block 68 is itself thermally nonconductive.

Other portions of the Schildmeyer et al. specification do discuss the optics block 68, and these portions clearly teach that the optics block is thermally conductive. For example, Schildmeyer et al. note that an "object of the invention was to devise a condensation nucleus counter having **improved vapor flow, especially in the viewing volume**, exhaust filtration and working fluid recovery." Column 2, lines 52-55 (emphasis added). As discussed in the Summary of the Invention, this object is at least partially achieved by "[h]eating of the [optics] block defining the view volume [thereby] prevent[ing] condensation of vapor on the block." Column 3, lines 4-7. Schildmeyer et al. also state that "[t]he optics block is preferably heated to prevent condensate on the particles from condensing on the optics block." Column 6, line 66 to column 7, line 1. In both of these portions of the specification, Schildmeyer et al. clearly state that heating of the optics block can prevent condensation of vapor on the block. A block subject to such intentional heating for condensation prevention would obviously be formed from a thermally conductive material. Thus, Schildmeyer et al. teach a thermally **conductive** optics block, which is in direct opposition to the claimed thermally **nonconductive** detection cell.

In addition, the figures of Schildmeyer et al. provide a clear teaching that the optics block 68 is formed from a conductive material, not a nonconductive material. In particular, the optics block 68 is depicted in section in Fig. 8 with a series of repeating, single parallel lines. As stated in the M.P.E.P., such repeating, single parallel lines are utilized to indicate a metallic object, further demonstrating that the optics block 68 is formed from a conductive material, such as metal. M.P.E.P. § 608.02, subsection IX.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 37.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 38

Claim 38 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell;
>
> a light trap that accepts the light beam after it passes through the detection cell;
>
> a heated inlet port that extends into said detection cell to control the trajectory of the particles and gas stream; and
>
> a heated exit port that extends into said detection cell to control the trajectory of the particles and gas stream; **wherein said heated inlet port and said heated exit port are thermally isolated from said detection cell.**

(emphasis added). None of the references of record disclose such a light scattering detector device. Schildmeyer et al. fail to teach each and every element of this claim.

Applicants previously argued that Schildmeyer et al. neither taught nor suggested a heated inlet port and a heated exit port thermally isolated from a detection cell. In particular, in both the present and the previous Office action, the Office argued that a first heating system 36 (Fig. 1) and a second heating system 40 (Fig. 2) were thermally isolated from the view volume 56 of the optics block 68. Applicants previously argued that these heating systems 36,40 cannot considered as anticipating the heated inlet port

and the heated outlet port because they do not extend into the detection cell. Applicants reassert this argument here, and in addition assert the following.

In addition to the previous argument, Applicants now additionally assert that the heating systems 36,40 cannot anticipate the heated inlet port and the heated exit port of claim 38 because both the first heating system 36 and the second heating system 40 are upstream of the volume 56 of the optics block 68 (see Fig. 1). To anticipate the **heated inlet port** and the **heated exit port** of claim 38, one of the heating systems 36,40 must be upstream of the volume 56 of the optics block 68, while the other of the heating systems 36,40 must be downstream of the volume 56 of the optics block 68. Without such an arrangement, the heating systems cannot anticipate both a heated inlet port and a heated exit port as required by claim 38. Because both the first heating system 36 and the second heating system 40 are upstream of the volume 56 of the optics block 68, there can be no anticipation.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 38.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim Rejections under 35 U.S.C. § 103(a)

Reconsideration of the rejection of claims 1, 2, 10-12, 23, and 24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,903,818 (Cerni et al.) in view of DE 38 41 979 A1 (Ostwald) is respectfully requested.

Claim 1

Claim 1 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a polarized beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell; and
>
> **a light trap that accepts the polarized beam after it passes through the detection cell, the light trap including,**

> **an elongated housing through which the polarized beam passes, and light absorptive material within the elongated housing**; and
>
> an absorptive filter disposed to substantially align the electric field vector of the polarized beam with the plane of incidence defined by the polarized beam and the normal to said absorptive filter, and disposed to intersect the polarized beam at an angle of incidence that approximates Brewster's angle.

(emphasis added). To establish a *prima facie* case of obviousness, the Office must (1) provide some suggestion or motivation in the cited reference, or in the knowledge generally available to one skilled in the art, to modify the reference, (2) demonstrate a reasonable expectation of success in the modification, and (3) demonstrate that the prior art reference teach or suggest all of the claim limitations. M.P.E.P. § 2143.

Applicants previously argued that there appeared to be no motivation to modify the light trap of Cerni et al. to provide the absorptive filter of Ostwald, let alone the light trap of claim 1. In particular, the light trap of claim 1, or that defined by Ostwald, cannot be used with Cerni et al. because (i) the light trap would kill the laser and (ii) the light inside the Cerni cavity is not polarized. Applicants reassert these arguments here and also submit additional arguments discussed below.

With respect to the motivation to combine, the Office concedes that there must be some teaching, suggestion, or motivation to combine or modify found in the references themselves or in the knowledge generally available to one of ordinary skill. The Office continues by stating that because Cerni et al. and Ostwald are each directed to measuring light scattering particles, their combination is acceptable. Applicants strongly disagree. Simply because references are in the same general art area does not inevitably lead to their successful combination. In fact, where the references teach away from one another, the combination must fail. In the present case, there is such a teaching by each reference, as will be discussed below.

Generally speaking, lasers include a laser cavity bound by two opposing mirrors. The laser cavity contains a lasing medium that emits photons during excitation. The opposing mirrors on opposite sides of the lasing medium reflect photons back and forth through the lasing medium, further enhancing stimulated emission. Some lasers have one mirror adapted for partial transmission and partial reflection, which allows some of the

photons to leave the cavity as conventional, extracavity laser light. Light within the cavity can be referred to as intracavity laser light.

Returning to the teaching away of the present case, Cerni et al. and Ostwald operate in fundamentally different ways with fundamentally different laser arrangements. Their combination would result in a failure of the Cerni et al. device to function properly. In particular, the apparatus of Ostwald is adapted to trap light of any kind. When combined with extracavity laser light, for example, the apparatus traps the extracavity light. But because the laser source does not allow all of its photons to leave the laser cavity due to its partially transmission/reflection mirror, the laser can continue to function with the intracavity laser light. In contrast, the device of Cerni et al. relies upon an intracavity detecting region 408. This region is inside the laser cavity itself. Thus there is no need for a light trap, as all of the laser light can be retained within the laser cavity for further excitation of the lasing medium. As Applicants stated in the previous response, the addition of a light trap as disclosed in Ostwald to the apparatus of Cerni et al. would stop the Cerni et al. laser from functioning. By placing such a light trap within the laser cavity, no photons would reach the second mirror and the lasing medium would no longer receive any reflected photons. Without these reflected photons from the second mirror 405, the laser could no longer function properly. In fact, the laser would never begin functioning at all because of the lack of photons. Thus, the light trap of Ostwald and the particle counter of Cerni et al. cannot be combined. They each teach away from one another, as one is an intracavity device while the other is applicable only to extracavity devices.

Furthermore, intracavity and extracavity designs function in such a different manner that one skilled in the art would not look to one for features applicable to the other. For example, because all of the laser light is retained within the laser cavity, intracavity lasers typically have intensities greater than about twenty to forty times extracavity lasers of similar power. Thus intracavity devices typically have higher sensitivities, making their teachings generally inapplicable to extracavity devices. Conversely, extracavity devices have the advantage of being able to use other types of light sources, which make their teachings generally inapplicable to intracavity devices, which function only with lasers.

In addition to the lack of suggestion or motivation to combine, the present *prima facie* case of obviousness also fails because the Office has failed to demonstrate a reasonable expectation of success in combining Cerni et al. and Ostwald by modifying the intracavity laser particle counter of Cerni et al. with the light trap of Ostwald. This second prong of the *prima facie* case of obviousness must also be satisfied to render a claim obvious. As discussed in great detail immediately above, however, this combination will fail to work because the intracavity light trap will not allow the laser of Cerni et al. to function. Thus, the Office can never demonstrate the present case of obviousness with the present references because there is no chance that such a modification will succeed.

Moreover, the present prima facie case of obviousness cannot satisfy the third prong of the obviousness test because it fails to demonstrate that the cited prior art references teach or suggest all of the claim elements. In particular, neither reference teaches or suggests a light trap having an elongated housing through which the polarized beam passes and light absorptive material within the elongated housing. The elongate housing and light absorptive material provide a particular function that is not taught or suggested by the Ostwald reference. In particular, the elongate housing and light absorptive material are adapted to absorb the "stray light" emissions of the laser as they pass through the elongate housing. "Stray light" emissions are those portions of the laser light not within the central, focused beam. This phenomenon is common to lasers, and can create a significant amount of reflection if not compensated. The present design of the elongated housing and light absorptive material is designed to minimize any reflection from these "stray light" emissions. Without the elongated housing and light absorptive material, an fraction of "stray light" emissions could be reflected back to the detector, thereby causing further noise. In other words, the absorptive filter at an angle of incidence that approximates Brewster's angle traps the collimated light, and the elongate housing and light absorptive material compensate and traps any "stray light" emissions. The combination of these elements must be found in the prior art. But the Ostwald reference does not disclose such an elongate housing with light absorptive material and therefore cannot anticipate claim 1.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1. Claims 2-24, which depend directly or indirectly from claim 1, are also submitted as patentable for the same reasons as set forth above with respect to claim 1.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Reconsideration of the rejection of claims 25 and 34 under 35 U.S.C. § 103(a) as being unpatentable over Prior Art of Present Invention (Fig. 1) in view of Cerni et al. is respectfully requested.

Claim 25

Claim 25 is directed to a light scattering detector device, comprising:

> a detection cell to accept particles suspended in a gas stream and permit a light beam to pass through a trajectory of the particles and gas stream;
>
> a sample light detector disposed to detect light scattered in the detection cell;
>
> a light trap that accepts the light beam after it passes through the detection cell;
>
> a sample compound lens collector to direct light scattered in the detection cell upon the sample light detector; and
>
> **a spherical mirror to direct light scattered in the detection cell to the compound lens collector**.

(emphasis added). The cited references cannot establish a *prima facie* case of obviousness because they fail to teach or suggest all of the claim limitations.

In the final Office action, the Office states that "applicant did not argue claim 25 and 34. Therefore, it is believed that the rejection of the claims 25 and 34 under 35 U.S.C. 103(a) is proper. (Final Office action dated August 9, 2006, page 18, lines 16-18). Applicants strongly disagree and direct the Office to page 17, lines 4-13 of the May 16, 2006 Amendment, where applicants clearly argued that the mirror 405 used in Cerni et al. sustains laser action in the cavity, while the claimed spherical mirror directs light scattered by the particles back to the detector, effectively increasing the solid angle of light seen by the detector.

Applicants respectfully request that the Office consider these arguments. Claims 26-34, which depend directly or indirectly from claim 25, are also submitted as patentable for the same reasons as set forth above with respect to claim 25.

CONCLUSION

The Commissioner is hereby authorized to charge $120.00 for one month extension of time to Deposit Account No. 19-1345.

Respectfully submitted,

Brian P. Klein, Reg. No. 44,837
SENNIGER POWERS
One Metropolitan Square, 16th Floor
St. Louis, Missouri 63102
(314) 231-5400

BPK/dss